Interview Summary	Application N .	Applicant(s)	
	09/695,423	KATO ET AL.	
	Examiner	Art Unit	
	Manjunath N Rao	1652	

#7

All participants (applicant, applicant's representative, PTO personnel):

(1) *Manjunath N Rao*. (3)_____.

(2) *Ms. Jamie U.*. (4)_____.

Date of Interview: *02 May 2002* .

Type: a)☒ Telephonic b)☐ Video Conference
c)☐ Personal [copy given to: 1)☐ applicant 2)☐ applicant's representative]

Exhibit shown or demonstration conducted: d)☐ Yes e)☐ No.
If Yes, brief description: _____ .

Claim(s) discussed: *147* .

Identification of prior art discussed: _____ .

Agreement with respect to the claims f)☐ was reached. g)☐ was not reached. h)☒ N/A.

Substance of Interview including description of the general nature of what was agreed to if an agreement was reached, or any other comments: *Applicant was informed that claim 147, which was missed inadvertantly by the Examiner, should belong to group VI of the restricted groups* .

(A fuller description, if necessary, and a copy of the amendments which the examiner agreed would render the claims allowable, if available, must be attached. Also, where no copy of the amendments that would render the claims allowable is available, a summary thereof must be attached.)

i)☐ It is not necessary for applicant to provide a separate record of the substance of the interview(if box is checked).

Unless the paragraph above has been checked, THE FORMAL WRITTEN REPLY TO THE LAST OFFICE ACTION MUST INCLUDE THE SUBSTANCE OF THE INTERVIEW. (See MPEP Section 713.04). If a reply to the last Office action has already been filed, APPLICANT IS GIVEN ONE MONTH FROM THIS INTERVIEW DATE TO FILE A STATEMENT OF THE SUBSTANCE OF THE INTERVIEW. See Summary of Record of Interview requirements on reverse side or on attached sheet.

Examiner Note: You must sign this form unless it is an Attachment to a signed Office action.

_____
Examiner's signature, if required

Summary f Record of Interview Requirements

Manual of Patent Examining Procedure (MPEP), Section 713.04, Substance of Interview Must be Made of Record
A complete written statement as to the substance of any face-to-face, video conference, or telephone interview with regard to an application must be made of record in the application whether or not an agreement with the examiner was reached at the interview.

Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews
Paragraph (b)
In every instance where reconsideration is requested in view of an interview with an examiner, a complete written statement of the reasons presented at the interview as warranting favorable action must be filed by the applicant. An interview does not remove the necessity for reply to Office action as specified in §§ 1.111, 1.135. (35 U.S.C. 132)

37 CFR §1.2 Business to be transacted in writing.
All business with the Patent or Trademark Office should be transacted in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

The action of the Patent and Trademark Office cannot be based exclusively on the written record in the Office if that record is itself incomplete through the failure to record the substance of interviews.

It is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiner's responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability.

Examiners must complete an Interview Summary Form for each interview held where a matter of substance has been discussed during the interview by checking the appropriate boxes and filling in the blanks. Discussions regarding only procedural matters, directed solely to restriction requirements for which interview recordation is otherwise provided for in Section 812.01 of the Manual of Patent Examining Procedure, or pointing out typographical errors or unreadable script in Office actions or the like, are excluded from the interview recordation procedures below. Where the substance of an interview is completely recorded in an Examiners Amendment, no separate Interview Summary Record is required.

The Interview Summary Form shall be given an appropriate Paper No., placed in the right hand portion of the file, and listed on the "Contents" section of the file wrapper. In a personal interview, a duplicate of the Form is given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephone or video-conference interview, the copy is mailed to the applicant's correspondence address either with or prior to the next official communication. If additional correspondence from the examiner is not likely before an allowance or if other circumstances dictate, the Form should be mailed promptly after the interview rather than with the next official communication.

The Form provides for recordation of the following information:
- Application Number (Series Code and Serial Number)
- Name of applicant
- Name of examiner
- Date of interview
- Type of interview (telephonic, video-conference, or personal)
- Name of participant(s) (applicant, attorney or agent, examiner, other PTO personnel, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). Note: Agreement as to allowability is tentative and does not restrict further action by the examiner to the contrary.
- The signature of the examiner who conducted the interview (if Form is not an attachment to a signed Office action)

It is desirable that the examiner orally remind the applicant of his or her obligation to record the substance of the interview of each case unless both applicant and examiner agree that the examiner will record same. Where the examiner agrees to record the substance of the interview, or when it is adequately recorded on the Form or in an attachment to the Form, the examiner should check the appropriate box at the bottom of the Form which informs the applicant that the submission of a separate record of the substance of the interview as a supplement to the Form is not required.

It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview.

A complete and proper recordation of the substance of any interview should include at least the following applicable items:
1) A brief description of the nature of any exhibit shown or any demonstration conducted,
2) an identification of the claims discussed,
3) an identification of the specific prior art discussed,
4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the Examiner,
5) a brief identification of the general thrust of the principal arguments presented to the examiner,
   (The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner.)
6) a general indication of any other pertinent matters discussed, and
7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicant's record of the substance of an interview. If the record is not complete and accurate, the examiner will give the applicant an extendable one month time period to correct the record.

Examiner to Check for Accuracy

If the claims are allowable for other reasons of record, the examiner should send a letter setting forth the examiner's version of the statement attributed to him or her. If the record is complete and accurate, the examiner should place the indication, "Interview Record OK" on the paper recording the substance of the interview along with the date and the examiner's initials.

DETAILED ACTION

Claims 25-43, 70-149 are still at issue and are present for examination.

Election/Restrictions

Applicant's election with traverse of Group I, claims 25-37 and 123-128, in Paper No. 8 is acknowledged. The traversal is on the ground(s) that the invention of group I is directed to an amylase and the invention of group VI is directed to a DNA sequence encoding the amylase of group I and the invention of group II is directed to a method of making the amylase of group I and that the search and examination of all these groups does not constitute a serious burden to the Examiner. Applicants also quote from the MPEP that if "the search and examination of an entire application can be made without a serious burden, the Examiner must examine on its merits even though it includes claims to distinct or independent inventions". Examiner respectfully disagrees with the above arguments of the applicants. As applicants recognize, each of the above group are drawn to separate inventions. The invention of group I is a polypeptide and the invention of group VI is a polynucleotide both of which are structurally and functionally distinct from each other. The invention of group II is drawn to a method of making the product of group I and the Examiner has already provided the reasons as to why the inventions are considered distinct according to the rules in the MPEP. Applicants argument that search and examination of polynucleotides and polypeptides and the method of making, does not cause undue burden to the Examiner is not found persuasive, because while the searches for the three groups overlap, they are not coextensive and does constitute extra burden to the Examiner. The search for Groups II and VI would each require the search of subclasses unnecessary for the

search of elected Group I. For example, search of Group I would require search of subclass 435/202 and search of Group VI would require search of subclass 435/69.1. Applicants also argue that pursuant to MPEP § 1850, in the PCT national phase cases, the Examiner is required to follow the determination of the International Bureau and cannot *sua sponte* set forth his or her own groupings for purposes of examination. Such an argument is misplaced as the instant application is not a PCT national phase application.

The requirement is still deemed proper and is therefore made FINAL.

Claims 38-43, 70-122 and 129-149 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention, the requirement having been traversed in Paper No. 8.

Priority

Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copy has been filed in parent Application No. 09/298,924, filed on 4-26-1999 which is now US Pat. 6391595.

Drawings

The drawings filed in this application has been accepted by the Examiner for examination purposes only.

Sequence Compliance

Applicant is required to comply with the sequence rules by inserting the sequence identification numbers of all sequences recited within the claims and/or specification. It is

particularly noted that applicants do not provide the appropriate SEQ ID NO to the sequences depicted in some figures and also to amino acid sequences depicted on page 150. Applicants have also not provided a electronic form of the sequences provided in the paper copy. See particularly 37 CFR 1.821(d).

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 25-37 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 25-37 recites the phrase "novel amylase". This phrase constitutes an opinion by applicant on the merits of the claim and is therefore not considered proper. Deletion of the word novel is suggested.

Claim 28 is rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Regarding claim 28, the phrase "such as" renders the claim indefinite because it is unclear whether the limitations following the phrase are part of the claimed invention. See MPEP § 2173.05(d).

Claims 35-37 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 35-37 recite the phrase an amylase claimed in claim 34, wherein the archaebacterium belonging to the genus Sulfolobus is S.solfataricus...or a variant thereof'. It is not clear to the Examiner as to whether applicants are claiming a "variant enzyme" or the enzyme from "variant bacteria".

Claims 123-124 and claims 125 to 128 which depend therefrom are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 123-124 and their dependent claims recite the phrase "or an equivalent sequence thereof'. It isn't clear to the Examiner as to what applicants mean by the above phrase in the context of the claim.

Claims 25-37, 123-128 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for an enzyme with SEQ ID NO:6 or 8 which is isolated from an archaebacterium belonging to genus Sulfolobus and which acts on a substrate saccharide composed of at least three sugar units wherein at least three sugar units from the reducing end are glucose residues so as to liberate principally monosaccharides and/or disaccharides by hydrolyzing the substrate saccharide from the reducing end side, does not reasonably provide enablement for all variants of such polypeptides or such polypeptides isolated from all other sources. The specification does not enable any person skilled in the art to which it pertains, or

with which it is most nearly connected, to make the invention commensurate in scope with these claims.

Factors to be considered in determining whether undue experimentation is required, are summarized in *In re Wands* (858 F.2d 731, 8 USPQ 2nd 1400 (Fed. Cir. 1988)) as follows: (1) the quantity of experimentation necessary, (2) the amount of direction or guidance presented, (3) the presence or absence of working examples, (4) the nature of the invention, (5) the state of the prior art, (6) the relative skill of those in the art, (7) the predictability or unpredictability of the art, and (8) the breadth of the claim(s).

Claims 25-37, 123-128 are so broad as to encompass any variant of SEQ ID NO:6 or 8 or any polypeptide from any source which acts on a substrate saccharide composed of at least three sugar units wherein at least three sugar units from the reducing end are glucose residues so as to liberate principally monosaccharides and/or disaccharides by hydrolyzing the substrate saccharide from the reducing end side. The scope of the claims is not commensurate with the enablement provided by the disclosure with regard to the extremely large number of polypeptides broadly encompassed by the claims. Since the amino acid sequence of a protein determines its structural and functional properties, predictability of which changes can be tolerated in a protein's amino acid sequence and obtain the desired activity requires a knowledge of and guidance with regard to which amino acids in the protein's sequence, if any, are tolerant of modification and which are conserved (i.e. expectedly intolerant to modification), and detailed knowledge of the ways in which the proteins' structure relates to its function. However, in this case the disclosure is limited to the amino acid sequence of only two such polypeptides.

While recombinant and mutagenesis techniques are known, it is not routine in the art to screen for multiple substitutions or multiple modifications, as encompassed by the instant claims, and the positions within a protein's sequence where amino acid modifications can be made with a reasonable expectation of success in obtaining the desired activity/utility are limited in any protein and the result of such modifications is unpredictable. In addition, one skilled in the art would expect any tolerance to modification for a given protein to diminish with each further and additional modification, e.g. multiple substitutions.

The specification does not support the broad scope of the claims which encompass all polypeptides with above activity or variants of SEQ ID NOS:6 or 8 because the specification does not establish: (A) regions of the protein structure which may be modified without effecting its activity; (B) the general tolerance of such polypeptides to modification and extent of such tolerance; (C) a rational and predictable scheme for modifying any residue in those polypeptides with an expectation of obtaining the desired biological function; and (D) the specification provides insufficient guidance as to which of the essentially infinite possible choices is likely to be successful.

Thus, applicants have not provided sufficient guidance to enable one of ordinary skill in the art to make and use the claimed invention in a manner reasonably correlated with the scope of the claims broadly including polypeptides with an enormous number of amino acid modifications of SEQ ID NOS: 6 and 8. The scope of the claims must bear a reasonable correlation with the scope of enablement (In re Fisher, 166 USPQ 19 24 (CCPA 1970)). Without sufficient guidance, determination of the intended polypeptides having the desired biological characteristics is unpredictable and the experimentation left to those skilled in the art is

unnecessarily, and improperly, extensive and undue. See In re Wands 858 F.2d 731, 8 USPQ2nd 1400 (Fed. Cir, 1988).

Claims 25-37, 123-128 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claims 25-37, 123-128 are directed to polypeptides which acts on a substrate saccharide composed of at least three sugar units wherein at least three sugar units from the reducing end are glucose residues so as to liberate principally monosaccharides and/or disaccharides by hydrolyzing the substrate saccharide from the reducing end side and variants of polypeptides with SEQ ID NO:6 or 8. Claims 25-37, 123-128 are rejected under this section of 35 USC 112 because the claims are directed to a genus of polypeptides which are derived from SEQ ID NO:6 or 8, including modified polypeptide sequences, modified by at least one of deletion, addition, insertion and substitution of an amino acid residue that have not been disclosed in the specification (claims 123-128) or any polypeptide having the functional properties of the enzymes of SEQ ID NO:6 or 8 (claims 25-37). No description has been provided of the modified polypeptide sequences encompassed by the claim. No information, beyond the characterization of SEQ ID NO:6 and 8 has been provided by applicants which would indicate that they had possession of the claimed genera of polypeptides. The specification does not contain any disclosure of the structure and function of all the polypeptide sequences including those derived from SEQ ID NO:6 or 8, including fragments and variants within the scope of the

claimed genus. The genera of polypeptides claimed are large variable genera including peptides which can have a wide variety of structures and functions. Therefore many structurally and functionally unrelated polypeptides are encompassed within the scope of these claims. The specification discloses only two species of the claimed genus which is insufficient to put one of skill in the art in possession of the attributes and features of all species within the claimed genus. Therefore, one skilled in the art cannot reasonably conclude that applicant had possession of the claimed invention at the time the instant application was filed.

Applicant is referred to the revised guidelines concerning compliance with the written description requirement of U.S.C. 112, first paragraph, published in the Official Gazette and also available at www.uspto.gov.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 25-37, 123-128 are rejected under 35 U.S.C. 102(b) as being anticipated by Lama et al. (Biotechnology Forum. Eur., 1991, Vol. 8(4):201-203). This rejection is based upon the public availability of a printed publication. Claims 25-37, 123-128 of the instant application is drawn to an amylase which acts on a substrate saccharide composed of at least three sugar units wherein the last three sugar units from the reducing end are glucose residues so as to liberate principally monosaccharides and/or disaccharides by hydrolyzing the substrate from the reducing end side

and the linkage between the first and the second glucose residues from the reducing end side is α-1, α-1 while the linkage between the second and the third glucose residues from the reducing end side is α-1,4 so as to liberate α, α-trehalose by hydrolyzing the α-1,4 linkage between the second and the third glucose residues, wherein the molecular weight of the enzyme is between 61,000 to 64,000, wherein the enzyme has an optimum pH range of pH 4.5-5.5, temperature range of 60-85 ° C and a pH stability in the range of pH 4.0 to 10.0 and a thermostability of 100% (activity) even after exposure at 80 ° C for 6 hours, an isoelectric point of pH 4.3 to 5.4, wherein the enzyme is inhibited by 5 mM of Cu salt and wherein the enzyme is derived from a bacteria belonging to *Sulfolobales*, belonging to the genus S.solfataricus or its variants and wherein the polypeptide of the enzyme comprises SEQ ID NO:6 or 8 or an equivalent sequence thereof, wherein the polypeptide comprises a methionine at the N-terminus and has an optimum temperature between 60 to 85 ° C. Lama et al. disclose an identical preparation of the enzyme isolated from the very same source i.e., S.solfataricus which could be a variant of the bacterial strains that applicants have claimed or an equivalent of the polypeptide with SEQ ID NO:6 or 8. Lama et al. describe an enzyme which acts on a substrate saccharide composed of at least three sugar units wherein the last three sugar units from the reducing end are glucose residues so as to liberate principally monosaccharides and/or disaccharides by hydrolyzing the substrate from the reducing end side and the linkage between the first and the second glucose residues from the reducing end side is α-1, α-1 while the linkage between the second and the third glucose residues from the reducing end side is α-1,4 so as to liberate α, α-trehalose by hydrolyzing the α-1,4 linkage between the second and the third glucose residues. Lama et al. also describe the enzyme as a thermophilic enzyme wherein the enzyme has an optimum pH between pH 4.5-5.5,

temperature range of 60-85 ° C and a pH stability in the range of pH 4.0 to 10.0 and a thermostability of 100% (activity) even after exposure at 80 ° C for more than 5 hours. The reference does not teach explicitly the isoelectric point of the enzyme as pH 4.3 to 5.4 or that the enzyme is inhibited by 5 mM of CuSO4. However, judging from all the other similarities between the enzyme of the reference and the enzyme claimed in the instant application, such characteristics including the amino acid sequence (SEQ ID NO:6 or 8) would be inherent characteristics of the said enzyme. Lama et al. do teach that the enzyme is inhibited by 4 mM of CuCl2. Therefore Lama et al. anticipate claims 25-37, 123-128 of this application as written.

In response to the above rejection applicants may argue that the reference provided by the Examiner does not provide support for all the limitations claimed. However, such an argument would not be persuasive to overcome the rejection because, first of all, applicants have included variants of the bacterial strains and equivalents of the enzyme. Secondly, characteristics such as amino acid sequence, a methionine being in the N-terminal of the enzyme, isoelectric point, mol.wt. etc. are all inherent characteristics of the enzyme and none of these characteristics have been imparted to the enzyme by the applicants. Furthermore, the decisions handed down in *In re Bell* and *In re Deuel* does not apply since applicants are claiming polypeptides and not polynucleotides. Lastly, since the Office does not have the facilities for examining and comparing applicants' protein with the protein of the prior art, the burden is on the applicant to show a novel or unobvious difference between the claimed product and the product of the prior art (i.e., that the protein of the prior art does not possess the same material structural and functional characteristics of the claimed protein). See In re Best, 562 F.2d 1252, 195 USPQ 430 (CCPA 1977) and In re Fitzgerald et al., 205 USPQ 594.

Conclusion

No claims are allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Manjunath Rao whose telephone number is (703) 306-5681. The Examiner can normally be reached on M-F from 7:30 a.m. to 4:00 p.m. If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, P.Achutamurthy, can be reached on (703) 308-3804. The fax number for Official Papers to Technology Center 1600 is (703) 305-3014. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0196.

REBECCA E. PROUTY
PRIMARY EXAMINER
GROUP ~~1800~~ 1600

Manjunath N. Rao. Ph.D.
July 23, 2002